Special Topics in Research and Resource Management at Indiana Dunes National Lakeshore

GLREC Biology Technician for the Indiana Dunes National Lakeshore:

Carlene Grecco

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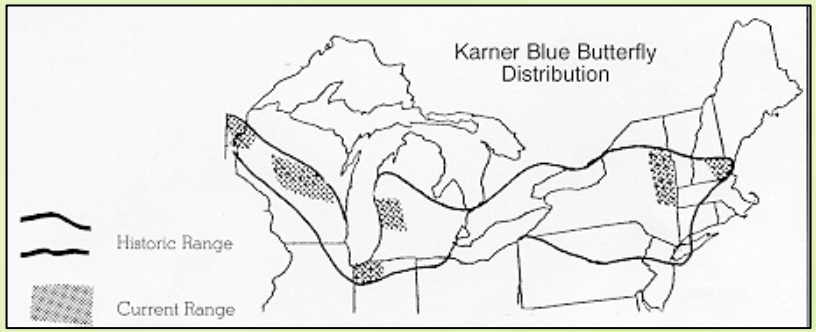
Karner Blue Butterfly
Lycaeides melissa samuelis

Federal Status: Endangered

Why Are There Propagation Programs for the Karner Blue Butterfly?

The Karner blue is found in scattered localities from Minnesota to New Hampshire. Attempts are being made to re-introduce it into the coastal habitats of Illinois, Indiana, Michigan, and Ohio.



Within its range, this species is restricted to dry sandy areas with open woods and clearings supporting wild blue lupine. This type of habitat is usually associated with pitch pine/scrub oak or oak savannah communities that are maintained by fire at an early stage of plant succession. The Karner blue is experiencing a decline primarily due to human activities such as agriculture, urbanization and fire suppression. The sandy habitat essential to the blue lupine, and therefore the Karner blue, occurs mostly along river valleys and outwash plains. Because of the location and topography of such areas, they have been heavily favored as settlement sites. Extinctions of entire populations of the Karner blue have occurred around large urban centers such as Chicago.

Description of the Karner Blue Butterfly

Karner Blue Butterfly (KBB)
Lycaeides melissa samuelis
Federal Status: Endangered

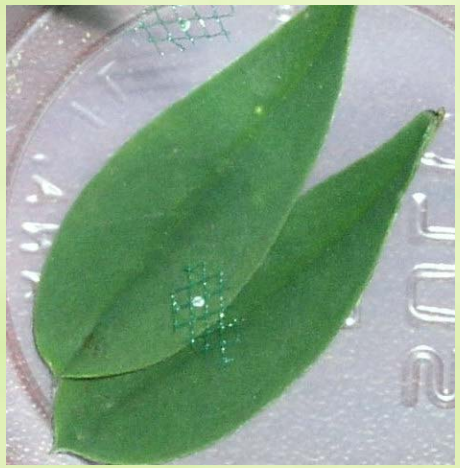
The Karner blue is a small butterfly with a wing span of approximately one inch. In the male, the upper surface of all four wings is a deep violet-blue fringed with white. In the female, the upper surface is a dusky brownish blue with orange spots on the edge of the hindwing. The lower surface is a pale silver with white- ringed black spots and rows of bright orange and blue markings near the edge of the hindwings. The protective coloration of the larva, which feed solely on blue lupine (*Lupinus perennis*) flowers and leaves. It reaches half an inch in length before changing into a pupa, perfectly matches the green leaves of the vegetation. The The larva is covered with very fine hairs. The adult KBBs, during their short one to two-week life span, will feed on the nectar of a variety of flowers, such as blue lupine, New Jersey tea, dogbane, and butterfly weed.

Life Cycle of the Karner Blue Butterfly

- **Stages include**
  - **Egg**
  - **Larva**
  - **Pupae or Chrysalis**
  - **Adult butterfly**
- **There are two generations of the KBB each year**
  - **The first hatching in April**
  - **The second hatching in June**

- The first generation of KBB is laid in the middle of-July
- These eggs over-winter and hatch the next year in April
- There are usually a larger amount of eggs laid in this brood because of the poor success rate of the eggs over the wintering period
- These eggs hatch and the larva pupate to become adults at the end May
- These adults lay their eggs in early June
- The new eggs laid in early June become adults in mid-July

KBB larvae feed only on blue lupine leaves and flowers



The Karner Blue Butterfly Project at the Great Lakes Research and Education Field Research Station

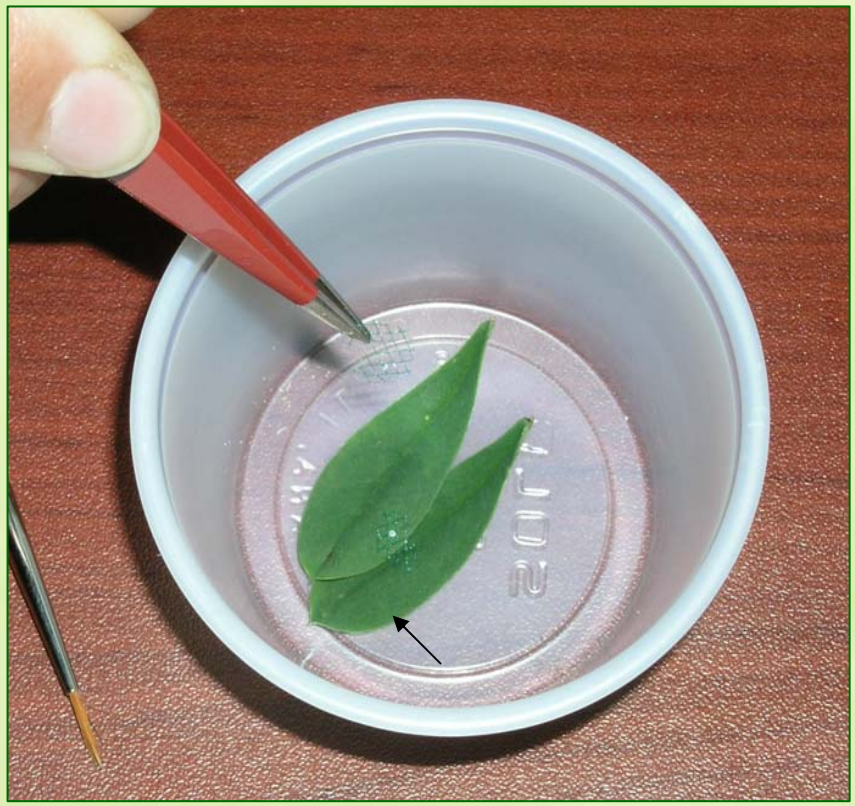
- **The project was managed by the Nature Conservancy headed by biolgists Paul Labus and John Drake.**
- **Began on May 30, 2006**
- **Ended July 11, 2006**
- **The adults from the first brood were used in this study**

Beginning the Project

- **Pots were placed under grow lamps that were on timers to simulate the suns daily cycle**
- **Lupine flowers as well as others were placed in the pots**
- **A sponge was also placed inside the pot underneath the netting which was soaked in a honey water solution once there was a butterfly inside that pot**

- The plants were misted with water regularly and the honey water solution was changed daily
- The area around the pots were thoroughly checked for spiders and insects which could be predators to the butterflies

- 20 adult female butterflies were caught and brought into the research station
- Once the adult butterfly had spent her 5 days inside the pot she was released and her eggs were harvested



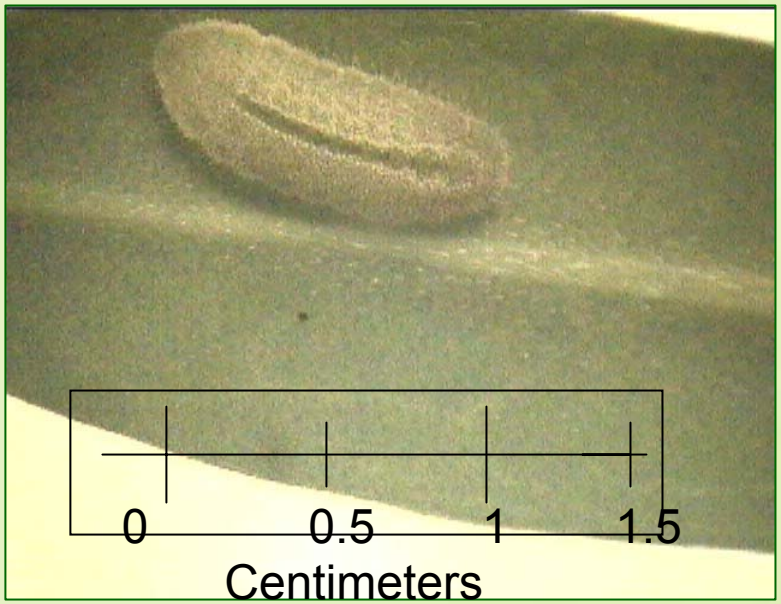
- **The dishes were checked daily for signs of larva (the eggs usually hatched within 5 days of being laid)**
- **Once the egg hatched the larva spend most of their time eating so the Lupine leaves are changed everyday to allow for a clean and fresh food supply**

Broken egg

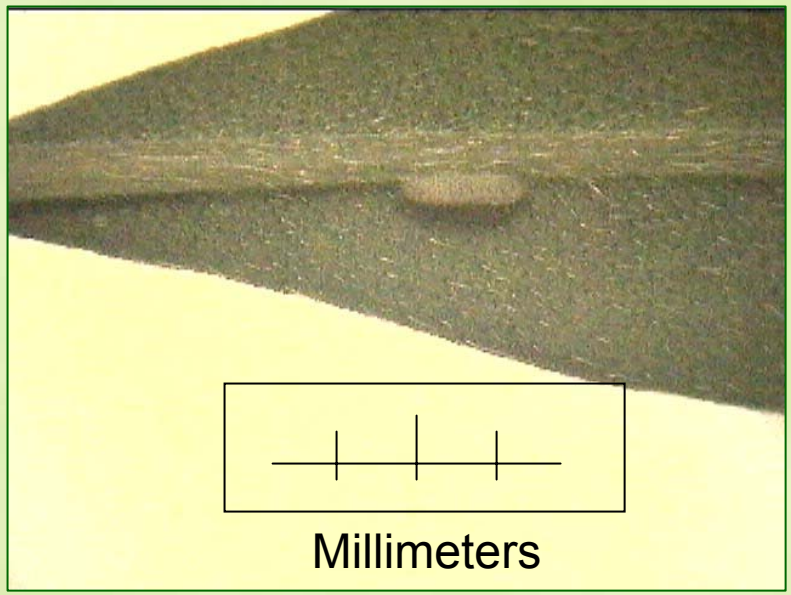
Checking for larva and changing Lupine leaves

LARVA

Larva in its fifth instars period



Larva in its first instars period



PUPAE

- **Once the larva have gone through the 5 instars the larva pupate and form the pupae or chrysalis**
- **Once the chrysalis turns a tan color it is ready to be taken out into the field to be released**

RELEASE

- The pupae were put into release nets where they could emerge in the wild without disturbance
- The locations of the release nets were chosen based on Lupine and food source (flowers) availability
- There were release sights at 4 different locations:
  - TNC Ivanhoe Dune & Swale Nature Preserve
  - TNC/Lake County Parks Tolleston Ridges Nature Preserve
  - TNC/IDNR DNP Dupont Natural Area
  - NPS INDU Howe's Prairie

RESULTS

- There were 639 eggs harvested.
- 508 larva (Nucleopolyhedrosis virus might have been a cause of death to some of the larva, it is a disease which ivades through the gut wall & causes internal organs to disintergrate).
- 360 larva developed into pupae
- 355 pupae were placed into release nets.
- 353 were expected to develop into adult butterflies.
- Each site had different amounts released there.
  - TNC Ivanhoe Dune & Swale Nature Preserve: 145 (a once populated site, now trying to reintroduce KBB)
  - TNC/Lake County Parks Tolleston Ridges Nature Preserve: 25 (sustained population, releasing pupae to increase genetic diversity)
  - TNC/IDNR DNP Dupont Nature Area: 45 (sustained population, releasing pupae to increase genetic diversity)
  - NPS INDU Howe's Prairie: 140 (new site, first in INDU, as part of 40th anniversary and plans to bring KBB to east unit)

Threats to the Karner Blue Butterfly

- ***Habitat Loss***
  - **Increase fragmentation**
  - **Result of vegetational succession without burning**
  - **Large-scale disturbances: large wildfire, unusual weather**

- ***Predators, Parasites***
  - **Larva Predators: Stink bugs, wasps, ants, spiders, ladybird beetles**
  - **Adult Predators: Spiders, robber flies, ambush bugs, assassin bugs, and dragonflies**

Management and Research Needs

Research is being conducted to develop methods of enhancing or creating habitat suitable for the KBB, in particular, the establishment and propagation of wild blue lupine. Methods used to establish or restore appropriate habitat conditions for blue lupine and the Karner blue include mowing and controlled burning. Protecting habitat from development is also important in preserving this species. Several of the largest populations of the KBB in Indiana Dunes National Lakeshore are protected and managed by the National Park Service according to the Karner Blue Butterfly Recovery Plan, in cooperation with the U.S. Fish and Wildlife Service.